

JADE COMPUTER PRODUCTS

CP/M 2.2 -- DOUBLE D

SOFTWARE MANUAL

IOD-1201M

Release 2

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The following is a list of specifications for this release of DOUBLE D CP/M 2.2.

1. Supports single and double density diskettes. Single and double density diskettes may be mixed on a drive-by-drive basis. The FORMAT program allows for density selection when formatting a diskette.
2. Supports single and double sided drives and diskettes. Single and double sided diskettes may be mixed on a drive-by-drive basis. The FORMAT program automatically determines the number of sides of the diskette and formats accordingly.
3. Supports the following Western Digital controller chips: FD1771-01, FD1793-01 and the entire FD179x-02 family. This software will operate both the true and inverted data bus controller chips and is controlled by setting USER SWITCH 0 on the DOUBLE D DISK CONTROLLER.
4. Supports the Serial Interface of the DOUBLE D DISK CONTROLLER as the LIST DEVICE. The EIA OUT is the serial output. In the distribution diskette, this is set to run at 9600 baud. The EIA IN is used to monitor the PRINTER READY signal. A positive signal level indicates ready. A single byte change in DCM allows for different baud rates.

The following is a list of files present on the JADE DOUBLE D diskette. A brief description is also included.

ASM.COM	CP/M ASSEMBLER - Provided by Digital Research.
BIOS.ASM	BASIC I/O SYSTEM - Provided by Digital Research.
	Bios for MDS development system.
BIOSGEN.COM	BIOS GENERATOR UTILITY - Used to read and write an image of the users CBIOS from and to system track 0. The image of DDBIOS resides at 1000H to 13FFH. Use DDT to put the DDBIOS image at that address.
BLT.ASM	BIOS LOADER TRANSIENT - Source code for "COLD START LOADER" as generated by MOVCPM.COM.
CPM20.COM	IMAGE of COLD START LOADER, CCP and BDOS in the same format as generated by MOVCPM 20 * and then SAVE 34 CPM20.COM.
DCM.ASM	DISK CONTROLLER MODULE - Source code (TDL Z80) for the DOUBLE D onboard Z80A.
DCM.HEX	DISK CONTROLLER MODULE - Intel Hex format of DCM.
DCMGEN.COM	DCM GENERATOR UTILITY - Used to read and write an image of the users DCM from or to system track 0. The image of DCM resides at 1000H to 13FFH. Use DDT to put DCM image at this address and to make patches.
DDBIOS.ASM	DOUBLE D BIOS - CP/M Assembler format source code for Double D BIOS. This assemble is listed in the software manual.
DDBIOS.HEX	DOUBLE D BIOS - Intel Hex format DDBIOS file.
DDBOOT.ASM	DOUBLE D BOOTSTRAP - CP/M Assembler format source code for the bootstrap.
DDT.COM	DYNAMIC DEBUG TOOL - Digital Research.
DEBLOCK.ASM	DEBLOCKING SOURCE CODE - Digital Research.
DISKDEF.LIB	DISK DEFINITION LIBRARY - Digital Research.
DUMP.ASM	FILE DUMP UTILITY - Source by Digital Research.
DUMP.COM	FILE DUMP UTILITY - COM by Digital Research.
ED.COM	EDITOR UTILITY - Digital Research.
FORMAT.ASM	FORMAT UTILITY - DOUBLE D format program source.
FORMAT.COM	FORMAT UTILITY - DOUBLE D format program. Formats on any drive A through D in single and double density.
LOAD.COM	LOAD UTILITY - Digital Research.
MOVCPM.COM	CP/M RELOCATION UTILITY - Generates CP/M system with BLT for Jade Double D.
OLDSYS.COM	SYSGEN UTILITY - Digital Research SYSGEN.COM as documented in CP/M manuals.
PIP.COM	FILE TRANSFER UTILITY - Digital Research.
STAT.COM	SYSTEM STATUS UTILITY - Digital Research.
SUBMIT.COM	CP/M BATCH SUBSYSTEM - Digital Research.
SYSGEN.COM	CSL/CCP/BDOS GENERATOR UTILITY - Double D system tracks compatible. Similar to SYSGEN.COM described in CP/M manuals but does not read or write BIOS. Use BIOSGEN for your CBIOS.
XSUB.COM	EXTENDED BATCH SUBSYSTEM - Digital Research.



The SYSTEM TRACKS have a different layout than the diskettes distributed by DIGITAL RESEARCH. This section presents a discription of the system tracks (0 and 1) as distributed for the JADE DOUBLE D disk controller board. Those modules residing on the SYSTEM TRACKS which often need to be modified for a specific system are on track 0, which is in single density. CCP and BDOS, which are not modified by the user are on track 1 in double density. All data tracks are in single density such that the DOUBLE D distribution diskette can be read and modified on most 8" single density CP/M systems.

The following table shows the layout of SYSTEM TRACK 0. This track is formatted in single density with 26 sequentially numbered sectors.

Sector Number	Execution Address	Format Ld Addr	Module Name
01	n.a.		IDT
02	1380H (DD)	1080H	BLT
03		1100H	
04	4A00H+b	1180H	BIOS
05	4A80H+b	1200H	BIOS
06	4B00H+b	1280H	BIOS
07	4B80H+b	1300H	BIOS
08	4C00H+b	1380H	BIOS
09	4C80H+b	1400H	BIOS
10	4D00H+b	1480H	BIOS
11	4D80H+b	1500H	BIOS
12		1580H	RSV
13	1000H (DD)	1600H	DCM
14	1080H (DD)	1680H	DCM
15	1100H (DD)	1700H	DCM
16	1180H (DD)	1780H	DCM
17	1200H (DD)	1800H	DCM
18	1280H (DD)	1880H	DCM
19	1300H (DD)	1900H	DCM
20	1380H (DD)	1980H	DCM
21	1400H (DD)	1A00H	RSV
22	1480H (DD)	1A80H	RSV
23	1500H (DD)	1B00H	RSV
24	1580H (DD)	1B80H	RSV
25	1600H (DD)	1C00H	RSV
26	1680H (DD)	1C80H	RSV

The following table shows the layout of SYSTEM TRACK 1. This track is formatted in double density with 50 physically staggered sectors.

Sector Number	Execution Address	Format Ld Addr	Module Name
01		1D00H	SPARE
02	3400H+b	1D80H	CCP
03	3480H+b	1E00H	CCP
04	3500H+b	1E80H	CCP
05	3580H+b	1F00H	CCP
06	3600H+b	1F80H	CCP
07	3680H+b	2000H	CCP
08	3700H+b	2080H	CCP
09	3780H+b	2100H	CCP
10	3800H+b	2180H	CCP
11	3880H+b	2200H	CCP
12	3900H+b	2280H	CCP
13	3980H+b	2300H	CCP
14	3A00H+b	2380H	CCP
15	3A80H+b	2400H	CCP
16	3B00H+b	2480H	CCP
17	3B80H+b	2500H	CCP
18	3C00H+b	2580H	BDOS
19	3C80H+b	2600H	BDOS
20	3D00H+b	2680H	BDOS
21	3D80H+b	2700H	BDOS
22	3E00H+b	2780H	BDOS
23	3E80H+b	2800H	BDOS
24	3F00H+b	2880H	BDOS
25	3F80H+b	2900H	BDOS
26	4000H+b	2980H	BDOS
27	4080H+b	2A00H	BDOS
28	4100H+b	2A80H	BDOS
29	4180H+b	2B00H	BDOS
30	4200H+b	2B80H	BDOS
31	4280H+b	2C00H	BDOS
32	4300H+b	2C80H	BDOS
33	4380H+b	2D00H	BDOS
34	4400H+b	2D80H	BDOS
35	4480H+b	2E00H	BDOS
36	4500H+b	2E80H	BDOS
37	4580H+b	2F00H	BDOS
38	4600H+b	2F80H	BDOS
39	4680H+b	3000H	BDOS
40	4700H+b	3080H	BDOS
41	4780H+b	3100H	BDOS
42	4800H+b	3180H	BDOS
43	4880H+b	3200H	BDOS
44	4900H+b	3280H	BDOS
45	4980H+b	3300H	BDOS
46		3380H	SPARE
47		3400H	SPARE
48		3480H	SPARE
49			SPARE
50			SPARE

# SYSTEM TRACK GENERATOR UTILITIES

The three generator utilities SYSGEN.COM, BIOSGEN.COM, and DCMGEN.COM provide the end user the ability to extract and rewrite various sections of the system tracks. The following table shows which sections of memory are used by each program and which system track modules are read or rewritten. SYSGEN.COM is similiar to the SYSGEN.COM described in the CP/M 2.0 manual set. Notice the difference is the BIOS module.

UTILITY	MODULE	TRACK	SECTORS	SYSTEM ADDRESS
SYSGEN.COM	BLT	0	2	0900-097FH
	CCP	1	2-17	0980-117FH
	BDOS	1	18-45	1180-1F7FH
BIOSGEN.COM	BIOS	0	4-11	1000-13FFH
DCMGEN.ASM	DCM	0	13-20	1000-13FFH

## CHANGING SYSTEM SIZE

---

The following section is intended to lead the customer through the sequence of operations needed to change the operating system size of a diskette. A 32K system is generated in this example.

Make a copy of DDBIOS.ASM, calling the new copy DDBIOS32.ASM indicating that this is to be a 32K DDBIOS. Edit this file changing the equate CPM\$NK from 20 to 32. See example below. Assemble this new program (expecting zero errors). In the PRN file of this assembly note the value generated for the name BIOS\$R. This value is used when loading DDBIOSnn.HEX. See the PRN section below.

---

```

; DECLARE CP/M 2.2 SYSTEM SIZE
;*****

0020 =      CPM$NK EQU      32      ;SYSTEM SIZE K BYTES.

;*****
; DOUBLE D HARDWARE PARAMETER - SYSTEM PORT AD
;*****

0043 =      D$PORT EQU      043H    ;DOUBLE D PORT ADDRESS

;*****
; SELECT NUMBER OF DISK DRIVES USED
;*****

0002 =      N$DRVS EQU      2      ;SELECT 1 TO 4 DRIVES.

;*****
; DISK OPERATING SYSTEM ADDRESSES.
;*****

0400 =      K$B EQU      1024      ;1K BYTE SIZE.
8000 =      CPM$SZ EQU      CPM$NK * K$B ;TOP SYSTEM AD
3000 =      CPM$BS EQU      CPM$SZ-(20*K$B) ;CP/M BIAS VAL

0100 =      TPA EQU      0100H      ;ADDRESS OF TP
6400 =      CCP EQU      CPM$BS+3400H ;ADDRESS OF CC
6C00 =      BDOS EQU      CPM$BS+3C00H ;ADDRESS OF BD
7A00 =      BIOS EQU      CPM$BS+4A00H ;ADDRESS OF BI
9600 =      BIOS$R EQU      1000H-BIOS ;DDT OFFSET 10
F000 =      BOOT EQU      0F000H     ;BOOT PROM JUM
0003 =      IO$LOC EQU      0003H    ;I/O BYTE LOCA
0004 =      DF$LOC EQU      0004H    ;DRIVE ASSIGN

;*****
; DOUBLE D SYSTEM PARAMETERS
;*****

```

---

The following section displays the system interaction as viewed from the console when writing DDBIOSnn.HEX to the system tracks. The left side of the example is the console interaction. The SYSTEM is printing in UPPER CASE while the user is typing in lower case. The right side of the example contains comments. PLEASE NOTE that the value for LOAD WITH OFFSET is the value set for BIOS#R.

CONSOLE INTERACTION	COMMENTS
A>ddt	EXECUTE DDT
DDT VERS 2.2	DDT SIGNON
-f1000,13ff,0	CLEAR MEMORY
-iddbios32.hex	ENTER FILENAME
-r9600	LOAD WITH OFFSET
NEXT PC	DDT RESPONDS
1309 0000	
-l1000	DISSASSEMBLE
1000 JMP 7A36	TO VERIFY LOAD
1003 JMP 7A42	
1006 JMP F006	
1009 JMP F009	
100C JMP F00C	
100F JMP 7AB0	
1012 JMP 7AAF	
1015 JMP 7AAC	
1018 JMP 7AD0	
101B JMP 7AD5	
101E JMP 7AF4	LOOKS GOOD
-s0	REBOOT SYSTEM
A>biosgen	EXECUTE BIOSGEN
JADE COMPUTER PRODUCTS	BIOSGEN SIGNS ON
BIOSGEN 2.2 - DOUBLE D	
EXTRACT BIOS FROM DRIVE (CR TO BYPASS)?	DO NOT EXTRACT
WRITE BIOS ON DRIVE (CR TO EXIT)? b	SELECT DRIVE
TYPE CR WHEN DRIVE B READY.	TYPE CR WHEN READY.
WRITE BIOS ON DRIVE (CR TO EXIT)?	WRITING TO DRIVE
A>	TYPE CR TO EXIT
	BACK TO CP/M

Now that DDBIOS has been written to the system tracks we will proceed to load CCP/BDOS. The following section displays system interaction as viewed from the console when generating a new size CCP/BDOS and writing this to the system tracks.

----- CONSOLE INTERACTION -----	----- COMMENTS -----
A>movcpm 32 *	EXECUTE MOVCPM
CONSTRUCTING 32K CP/M VERS 2.2	USE '*' OPTION
READY FOR "SYSGEN" OR	MOVCPM SIGNON
"SAVE 34 CPM32.COM"	
A>sysgen	MOVCPM FINISHED EXECUTE SYSGEN
JADE COMPUTER PRODUCTS	
SYSGEN 2.2 - DOUBLE D	SYSGEN SIGNON
EXTRACT SYS FROM DRIVE (CR TO BYPASS)?	DO NOT EXTRACT
WRITE SYS ON DRIVE (CR TO EXIT)? b	SELECT DRIVE
TYPE CR WHEN DRIVE B READY.	CR WHEN READY
WRITE SYS ON DRIVE (CR TO EXIT)?	WRITING ON DRIVE
A>	CR TO EXIT
-----	-----

This completes the steps needed to generate the system tracks for a different system size.

Besides containing CCP/BDOS and DDBIOS, the system tracks must also contain DCM (Disk Controller Module). The following sequence display system interaction as viewed from the console when writing DCM to the system tracks. Please note that after verifying a proper load (by displaying some of DCM) that any timing or other modifications to DCM should be made before exiting DDT.

CONSOLE INTERACTION	COMMENTS
A>ddt	EXECUTE DDT
DDT VERS 2.2	DDT SIGNS ON
-f1000,13ff,0	CLEAR MEMORY
-idcm2.hex	ENTER FILENAME
-r	LOAD ABSOLUTE
NEXT PC	DDT RESPONDS
13AF 0000	
-d1000,103f	TO VERIFY LOAD
1000 C3 00 00 C3 80 17 41 10 06 19 10 FE C3 74 10 00 .....A..	
1010 5E 01 50 00 50 00 01 00 FD E1 DB 05 D3 07 78 A9 ^..P.P....	
1020 D3 04 08 FE 3E D0 A9 D3 04 E3 E3 E3 E3 DB 04 A9 .....>....	
1030 C9 00 00 00 00 00 00 00 DB 20 D1 2A 06 10 E9 FB .....REBOOT SYSTEM	
-s0	
A>dcmgen	EXECUTE DCMMGEN
JADE COMPUTER PRODUCTS	DCMGEN SIGNS ON
DCMGEN 2.2 - DOUBLE D	
EXTRACT DCM FROM DRIVE (CR TO BYPASS)?	DO NOT EXTRACT
WRITE DCM ON DRIVE (CR TO EXIT)?	SELECT A DRIVE
TYPE CR WHEN DRIVE B READY.	TYPE CR WHEN READY.
WRITE DCM ON DRIVE (CR TO EXIT)?	TYPE CR TO EXIT
A>	BACK TO CP/M

## NEW CP/M 2.2

### BDOS FUNCTIONS

```
*****
* FUNCTION 37:  RESET DRIVE      *
*                               *
*****
* Entry Parameters:             *
*   Register   C:  25H          *
*   Register  DE:  Drive Vector *
*                               *
* Returned Value :              *
*   Register   A:  00H          *
*****
```

The RESET DRIVE function allows resetting of specified drive(s). The passed parameter is a 16 bit vector of drives to be reset, the least significant bit is drive A:.

In order to maintain compatibility with MP/M, CP/M returns a zero value.

```
*****
* FUNCTION 40:  WRITE RANDOM WITH*
*              ZERO FILL         *
*****
* Entry Parameters:             *
*   Register   C:  28H          *
*   Register  DE:  FCB Address  *
* Returned Value:              *
*   Register   A:  Return Code  *
*****
```

The WRITE RANDOM WITH ZERO FILL operation is similar to FUNCTION 34: with the exception that a previously unallocated block is filled with zeros before the data is written.



# DIGITAL RESEARCH CP/M<sup>R</sup> 2.2 FIELD SOFTWARE CHANGE

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ID# CPM22-0001 PROGRAM: BDOS ISSUE DATE: 02/19/80

**Error Description:** The following change affects only those CP/M systems which are using the optional blocking and deblocking algorithms listed in Appendix G of the CP/M Alteration Guide. If you are in doubt as to the applicability of this field change, please contact Digital Research or your CP/M distributor.

**Patch Procedure:** Ensure you have an archive copy of the distributed MOVCPM.COM file. Make changes to a version of MOVCPM.COM by carefully following the steps shown below: MOVCPM.COM is loaded into memory using DDT and the changes are made using the Assemble (A) and Set (S) commands. After making the changes, return to the console command processor using the Go (G) command, and SAVE the altered memory image on disk. The memory image on tracks 0 and 1 must also be updated. This can be accomplished by executing the new MOVCPM program, as described in the CP/M Alteration Guide, and integrating your customized I/O system.

```
ddt movecpm.com
```

```
DDT VERS 2.0
```

```
NEXT PC
```

```
2700 0100
```

```
-alcd2
```

```
1CD2 nop
```

```
1CD3 nop
```

```
1CD4 lxi h,0
```

```
1CD7
```

```
-G0
```

```
save 38 movecpm.com
```

**NOTE:** This Field Software change is not installed in the CP/M version 2.2. It must be installed in all systems which use the deblocking algorithms listed in Appendix G of the CP/M Alteration Guide.

JADE COMPUTER PRODUCTS  
4901 W. ROSECRANS BLVD  
HAWTHORNE, CALIF 90250

Subject: Engineering Change Notice # 1.  
Product: Double D Disk Controller.  
Revision: B and C revision boards.  
Date: August 4, 1980.

It has been reported that insertion of the Double D Disk Controller into of some S100 systems prevents normal operation. Usually on these systems the common characteristic is that they just will not operate. Please note S100 Bus pins #20, #53, and #70 are connected to ground, as per S100 Standards, IEEE Task 696.1/D2. These pin connections do cause interference with IMSAI front panel systems or CPU boards designed to operate with front panels. It is permissible to cut the foil links connecting pins #20, 53, and 70 to their respective plate-thru-holes. Please verify in your system documentation that these pins are causing interference before cutting.

---

Subject: Engineering Change Notice # 2.  
Product: Double D Disk Controller.  
Revision: B and C revision boards.  
Date: August 4, 1980.

A review of the Double D 8" phase locked loop has been completed. This has resulted in a reselection of some component values. Enhanced operation, particularly in double density, will be realized with the following modification. This modification will double the loop capture range and also eliminate a cause of loop instability.

With the exception of R1, just change those resistors listed for the new values as shown in the list. R1 does have a changed value but also must be installed so that it will connect to +5 volts regulated instead of the previous connection to Vx. With careful lead bending and resistor placement, one lead can solder to the +5V foil running from pin #16 of IC 1A to pin #16 of IC 1B. It would help to scrape some of the solder mask away before soldering R1 to this foil. Vx will now measure about +5.0 volts. Installation of the modification will require retuning the PLL.

R1	6.8K 1/4W (TO +5v)	R42	470K 1/4W
R3	12K 1/4W	R43	2.7K 1/4W
R4	10K 1/4W	R49	JUMPER
R38	20K 1/4W		

---

Subject: Engineering Change Notice # 3.  
Product: Double D Disk Controller.  
Revision: B and C revision boards.  
Date: August 4, 1980.

The Double D Disk Controller uses S-100 signal Swo\*. CPUs such as SBC-100 and SBC-200 do not generate these signals and therefore present an interface problem. The following modification has solved the problem with the above mentioned boards.

1. On the solder side of the board: Cut the foil link from S-100 pin # 97 to the plate-thru-hole.
2. On the Solder Side of the Board: Using a small gauge wire Jumper IC 1H pin #2 to IC 3J pin #1.

---

Subject: Engineering Change Notice # 4.  
Product: Double D Disk Controller.  
Revision: B and C revision boards.  
Date: August 4, 1980.

The Double D Disk Controller exhibits erratic operation when run with the Bis-Z Z80 CPU board. The problem exists on the Bis-Z board. The following modification fixes this problem. Note: The Bis-Z does not send out write data to the S-100 Bus until it actually sends the write strobe. This modification allows the write data to settle on the S-100 Bus before the write strobe is issued.

1. On the solder side Bis-Z: Cut the foil from IC 22 pin # 13.
2. On the solder side Bis-Z: Jump IC 22 pin # 13 to pin # 3.

---

Subject: Engineering Change Notice # 5.  
Product: Double D Disk Controller.  
Revision: B and C revision boards.  
Date: August 5, 1980.

NOTICE concerning use of the Double D disk controller with Jade release #2 of CP/M 2.2. Connector J3 pin #48 was designated ILLEGAL PACK\*. It has been redefined and it is now designated TWO SIDED\*.

Many Shugart SA800/801, Siemens FD100-8, and other models of disk drives have optional data separators installed. Disk drives using these options use pin #48 of the 50 line ribbon for the SEPERATED DATA\* signal. As release #2 (specifically DCM2) monitors this signal line for TWO SIDED\*, erratic disk operation would be expected. Please cut the foil link between the two plate-thru-holes at J3 pin #48. For use with the SA850/851 disk drive a jumper should be installed on the J3 patching area from the lower pin # 48 plate-thru-hole to the upper pin #10 plate-thru-hole. This completes the path for the TWO SIDED\* signal from the SA850/851.

---

Subject: Engineering Change Notice # 6.  
Product: Double D Disk Controller.  
Revision: B and C revision boards.  
Date: August 5, 1980.

NOTE: Concerning the Double D Disk Controller when used with 64K of system memory or any other memory arrangement where the Double D memory window overlaps assigned memory space.

When used in this configuration the Phantom Block must be jumpered to complete the PHAN\* signal path to the S100 bus. The Phantom Block is located below IC 4D. It appears as two plate-thru-holes enclosed by a silkscreen border labeled PHAN\*. Add a jumper connecting these two holes together. Any memory board that the Double D is to overlap must be configured so as to be disabled when responding to the Phantom signal (PHAN\*).

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Engineering